

ENT 34 ANDT

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Having thus described the invention, what is claimed is:

1. A tool rig for the compaction of particulate materials, comprising:
a base;
a cylinder block disposed on the base;
first and second pistons disposed within the cylinder block, the second piston being at least partially disposed within the first piston; and
first and second supply means for connecting an energy supply to the second piston from positions within the second piston to cause the second piston to move independently from movement of the first piston, the first supply means causing the second piston to move in a first direction and the second supply means causing the second piston to move in a second direction opposite the first direction.
2. The tool rig of claim 1, wherein the first and second supply means respectively include first and second channels defined by a supply component at least partially disposed within the second piston.
3. The tool rig of claim 2, wherein the supply component is stationary relative to the base.
4. The tool rig of claim 2, wherein the first and second channels extend through the base.

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5. The tool rig of claim 2, wherein the supply component defines a central bore.
6. The tool rig of claim 5, further comprising
a third piston disposed within the central bore; and
third supply means for connecting an energy supply to the third piston from a position within the second piston to cause the third piston to move independently from movement of the first and second pistons.
7. The tool rig of claim 1, wherein the first and second pistons are concentric.
8. The tool rig of claim 1, further comprising at least two connecting lateral pistons at least partially contained within the cylinder block, to connect at least one platen to the cylinder block.
9. The tool rig of claim 1, further comprising at least one linear encoder disposed in the base.
10. The tool rig of claim 1, further comprising a mechanical stop for at least one of the pistons.
11. The tool rig of claim 10, wherein the mechanical stop is adjustable.

12. The tool rig of claim 11, wherein the mechanical stop includes an inner ring with an external thread that connects to an internal thread of an outer ring, whereby the stop is adjusted by rotation of the outer ring.

13. A tool rig for the compaction of particulate materials, comprising:
a base;
a cylinder block disposed on the base;
first and second pistons disposed within the cylinder block, the second piston being at least partially disposed within the first piston; and
a supply component disposed in the second piston, the supply component defining first and second channels providing an energy supply causing the second piston to move independently from movement of the first piston, the first channel providing an energy supply causing the second piston to move in a first direction and the second channel providing an energy supply causing the second piston to move in a second direction opposite the first direction.

14. The tool rig of claim 13, wherein the first and second pistons are on essentially the same level.

15. The tool rig of claim 13, further comprising a third piston, wherein two of the three pistons are on essentially the same level and one of the three pistons is on a different level from the two pistons that are on essentially the same level.

16. The tool rig of claim 13, wherein the supply component defines a central bore.

17. The tool rig of claim 16, further comprising a third piston disposed within the central bore.

18. The tool rig of claim 17, further comprising supply means for connecting an energy supply to the third piston from a position within the second piston to cause the third piston to move independently from movement of the first and second pistons.

19. The tool rig of claim 13, further comprising at least one linear encoder disposed in the base.

20. The tool rig of claim 13, further comprising a mechanical stop for at least one of the pistons.

21. The tool rig of claim 20, wherein the mechanical stop is adjustable.

22. The tool rig of claim 21, wherein the mechanical stop includes an inner ring and an outer ring, whereby the stop is adjusted by rotation of the outer ring.

23. A press for the compaction of particulate materials, comprising:
a frame; and
a tool rig for the compaction of particulate materials connected to the frame, including a base, a cylinder block disposed on the base, first and second pistons disposed within the cylinder block, the second piston being at least partially disposed within the first piston, and first and second supply means for connecting an energy supply to the second piston from positions within the second piston to cause the second piston to move independently from movement of the first piston, the first supply means causing the second piston to move in a first direction and the second supply means causing the second piston to move in a second direction opposite the first direction.

24. The press for the compaction of particulate materials of claim 23, wherein the first and second supply means respectively include first and second channels defined by a supply component at least partially disposed within the second piston.

25. The press for the compaction of particulate materials of claim 23, wherein the tool rig is integrally connected to the frame.

26. The press for the compaction of particulate materials of claim 23, wherein the tool rig is removably connected to the frame.

27. The press for the compaction of particulate materials of claim 23, further comprising electric controls.

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28. The press for the compaction of particulate materials of claim 23,
further comprising hydraulic controls.

29. The press for the compaction of particulate materials of claim 23,
further comprising pneumatic controls.